

REMARKS

Applicant respectfully requests reconsideration and allowance of the subject application. Claims 15, 30, 35, 50, and 53 are amended. Claims 1-14, 36, and 45 are canceled without prejudice. Claims 15-35, 37-44, and 46-54 are pending in this application.

Withdrawn Claims

Claims 1-14, previously withdrawn from consideration, are canceled without prejudice as part of this amendment. Applicant reserves the right to pursue claims 1-14 in one or more divisional or continuation applications.

35 U.S.C. § 102

Claims 15-21, 24-31, 35-40, 43-46, 49, and 50-54 stand rejected under 35 U.S.C. §102(e) as being unpatentable over U.S. Patent No. 6,292,574 to Schildkraut et al. (hereinafter "Schildkraut"). Claims 36 and 45 have been canceled without prejudice, thereby rendering the rejection of claims 36 and 45 moot. Applicant respectfully submits that claims 15-21, 24-31, 35, 37-40, 43, 44, 46, 49, and 50-54 are not anticipated by Schildkraut.

Schildkraut is directed to a computer program product for redeye detection involving several steps (see, title and Fig. 2). The program begins by identifying all separate continuous skin colored regions in the image (see, Fig. 2 step S4, and col. 2, lines 37-39). A sub-map of each skin colored region is formed by cutting out from the skin map the smallest rectangular section that contains all of that skin region (see, Fig. 2 step S6, and col. 4, lines 1-4). Next, an ellipse is fitted to the

individual skin color sub-maps (see, Fig. 2 step S8, and col. 4, lines 13-15). A human face is approximately elliptical, so if the skin color sub-map is of a human face then the ellipse should fit the skin color map well (see, col. 4, lines 19-21). A "Fit" value is generated that measures the fit of an ellipse to the skin color sub-map (see, col. 4, lines 19-41). If the "Fit" value is less than a predetermined value then the program concludes that the skin colored region is not a face and it is not processed further (see, col. 4, lines 38-41).

In addition to the "Fit" value, the program determines an aspect ratio of the ellipse (see, col. 4, lines 42-51). If the aspect ratio is greater than a maximum value then the skin colored region corresponds to an object in the image that is too long and thin to be a face (see, col. 4, lines 51-54), and the program determines that the skin colored region is not a face and does not process it further (see, col. 4, lines 54-56).

Now that the program has identified the skin colored regions that have the shape of a face, the location of candidate redeyes are identified (see, Fig. 2 step S16, and col. 5, lines 21-24). This identification is based on sub-color-images, which are cut-out from the color image and correspond exactly to the location of the sub-maps (see, col. 5, lines 4-6 and 24-25).

An eye detection process is then performed based on the process of template matching, which may include resizing the template (see, Fig. 2 step S20, and col. 6, lines 37-55). The eye detection process outputs the best pair of candidate redeye pixels (see, Fig. 11 and col. 9, lines 60-62). A confirmation that this best pair of candidate redeye pixels has indeed located a pair of redeyes is

then performed based on the fact that a human face is approximately symmetric about a line that bisects the face (see, col. 9, line 66 – col. 10, line 46).

In contrast, amended claim 15 recites:

15. (Currently amended) A system comprising:
a region detection module to detect regions of an image that include pixels of a particular one or more colors without requiring faces within the image to be previously detected; and
an eye confirmation module to receive the detected regions from the region detection module and identify, for each of the detected regions, whether the detected region is part of an eye.

Applicant respectfully submits that Schildkraut does not disclose a region detection module to detect regions of the image that include pixels of a particular one or more colors without requiring faces within the image to be previously detected as recited in amended claim 15.

As discussed above, prior to identifying the location of candidate redeyes, the program of Schildkraut identifies the skin colored regions that have the shape of a face. Any regions that do not have the shape of a face are not processed further by Schildkraut and never make it to the step of identification of the location of candidate redeyes. Thus, Applicant respectfully submits that Schildkraut does not disclose a region detection module to detect regions of the image that include pixels of a particular one or more colors without requiring faces within the image to be previously detected as recited in amended claim 15.

Thus, for at least these reasons, Applicant respectfully submits that amended claim 15 is allowable over Schildkraut.

Given that claims 16-21, 24, 25, and 27-29 depend from amended claim 15, Applicant respectfully submits that claims 16-21, 24, 25, and 27-29 are likewise

allowable over Schildkraut for at least the reasons discussed above with respect to amended claim 15.

With respect to claim 26, claim 26 depends from amended claim 15 and Applicant respectfully submits that claim 26 is allowable over Schildkraut due to its dependency on amended claim 15. Furthermore, Applicant respectfully submits that Schildkraut does not disclose wherein the eye confirmation module comprises a multi-scale classifier to apply a window to the image and compare pixels within the window to an eye template, to alter the scale of the image, and then to repeat the application of the window to the scale-altered image and comparison to the eye template as recited in claim 26.

Schildkraut discusses resizing of a template during the eye detection procedure (see, col. 6, line 37 – col. 7, line 4). Schildkraut also discusses that the scale of the eye relative to the original eye template is related to the distance between the candidate redeye pixel pair by an equation determining a value S_{pair} , which is based on the columns of the left and right candidate redeye pixels, the rows of the left and right candidate redeye pixels, and the template eye distance (see, col. 7, lines 8-19). This value of S_{pair} , however, is used to select templates (see, col. 7, lines 26-33). Nowhere does Schildkraut discuss using the value of S_{pair} to alter the scale of the image as recited in claim 26. Applicant respectfully submits that resizing of a template or selecting a template does not disclose altering the scale of an image as recited in claim 26.

Thus, for at least these reasons, Applicant respectfully submits that claim 26 is allowable over Schildkraut.

With respect to claim 30, claim 30 has been rewritten in independent format, incorporating the elements of its base claim (claim 15 as originally written) and intervening claims (claims 27 and 28). Claim 30 recites:

30. A system as recited in claim 28 comprising:
a region detection module to detect regions of an image that include pixels of a particular one or more colors, wherein the region detection module comprises:
a pixel identifier that is trained to colors associated with red-eye, and wherein the pixel identifier is to identify pixels within the region having colors that are close to the colors associated with red-eye;
a pixel grouper coupled to receive the identified pixels from the pixel identifier and group together adjacent pixels;
a filter to receive an indication of the groups of pixels from the pixel grouper and to identify, based on a set of rules, which of the groups are to be output to the eye confirmation module as detected regions; and
an eye confirmation module to receive the detected regions from the region detection module and identify, for each of the detected regions, whether the detected region is part of an eye.

Applicant respectfully submits that Schildkraut does not disclose a system comprising a region detection module and eye confirmation module as recited in claim 30.

With regard to claim 30, in the January 5 Office Action, it was asserted that "Schildkraut further discloses a filter (either skin region or not skin region pixel) based on a set of rules and send them as detected regions (fig. 2-3, col. 3-6, note that the rules are implemented in the procedures such as S4j or S10 etc.)" (see, January 5 Office Action at p. 4, first paragraph). Applicant respectfully disagrees and submits that Schildkraut does not disclose a filter as recited in claim 30.

The filter of claim 30 is "to receive an indication of the groups of pixels from the pixel grouper and to identify, based on a set of rules, which of the groups

are to be output to the eye confirmation module as detected regions". These groups of pixels were grouped by the pixel grouper based on the pixels identified by the pixel identifier. The pixel identifier is to identify pixels within the region having colors that are close to the colors associated with red-eye. Thus, the filter of claim 30 is to identify which of the groups of pixels having colors that are close to the colors associated with red-eye are to be output to the eye confirmation module.

In contrast, the rules that are asserted as being disclosed in Schildkraut refer to identification of skin regions, not pixels having colors that are close to the colors associated with red-eye. Step S4j discusses that regions for which an assigned score P_{skin} exceeds a threshold T_{skin} are referred to as skin-colored regions (see, col. 3, lines 27-28). Step S10 discusses whether a skin sub-map has an acceptable degree of fit to an ellipse and the ellipse has an acceptable aspect ratio, and if so then the map potentially indicates the position of a face (see, col. 4, lines 13-58). This "Fit" is based on the number of skin colored pixels in the map, the number of skin colored pixels that fall outside the ellipse, the number of skin colored pixels that are inside the ellipse, and the number of pixels in the ellipse (see, col. 4, lines 22-31).

Nothing in these cited portions of Schildkraut discusses a filter to identify which of the groups of pixels having colors that are close to the colors associated with red-eye are to be output to an eye confirmation module as recited in claim 30. As discussed above, these cited portions of Schildkraut discuss identification of skin regions, not pixels having colors that are close to the colors associated with red-eye or a filter to identify which of the groups of pixels having colors that are

close to the colors associated with red-eye are to be output to an eye confirmation module as recited in claim 30.

Thus, for at least these reasons, Applicant respectfully submits that claim 30 is allowable over Schildkraut.

Given that claim 31 depends from claim 30, Applicant respectfully submits that claim 30 is likewise allowable over Schildkraut for at least the reasons discussed above with respect to claim 30.

With respect to amended claim 35, amended claim 35 has been amended to incorporate the elements of claims 36 and 45. Amended claim 35 recites:

35. A method comprising:
receiving an image;
searching a set of areas of the image for candidate pixels of one or more colors, wherein the one or more colors comprise colors corresponding to red-eye;
combining the candidate pixels into a set of one or more pixel groups, wherein the combining comprises combining candidate pixels into the same group if the candidate pixels are adjacent one another; and
for each pixel group in the set of one or more pixel groups, classifying the pixel group as being part of an eye or not part of an eye.

Applicant respectfully submits that Schildkraut does not disclose a method comprising searching a set of areas of the image for candidate pixels of one or more colors, wherein the one or more colors comprise colors corresponding to red-eye, and combining the candidate pixels into a set of one or more pixel groups, wherein the combining comprises combining candidate pixels into the same group if the candidate pixels are adjacent one another as recited in amended claim 35.

Applicant respectfully submits that Schildkraut does not disclose combining of candidate pixels into groups, the candidate pixels of one or more

colors corresponding to red-eye as recited in amended claim 35. Schildkraut discusses identifying the location of candidate redeyes based on peak values (see, col. 5, lines 20-67). A pixel that has been classified as a peak is a candidate redeye pixel (see, col. 6, lines 3-4). Applicant respectfully submits, however, that classifying a pixel as a peak value does not disclose searching a set of areas of an image for candidate pixels, and combining candidate pixels into the same group if the candidate pixels are adjacent one another as recited in amended claim 35.

Thus, for at least these reasons, Applicant respectfully submits that amended claim 35 is allowable over Schildkraut.

Given that claims 37-40, 43, 44, 46, and 49 depend from amended claim 35, Applicant respectfully submits that claims 37-40, 43, 44, 46, and 49 are likewise allowable over Schildkraut for at least the reasons discussed above with respect to amended claim 35.

With respect to amended claim 50, Applicant respectfully submits that, similar to the discussion above regarding amended claim 15, Schildkraut does not disclose a region detector to detect regions of the image that include red pixels without requiring faces within the image to be previously detected as recited in amended claim 50.

Furthermore, amended claim 50 is directed to a camera. Applicant respectfully submits that nowhere does Schildkraut discuss a camera. Additionally, as stated in the January 5 Office Action, "Schildkraut does not expressly mention the implementation of red-eye correction into the camera and printer" (see, January 5 Office Action at middle/bottom of p. 5).

Thus, for at least these reasons, Applicant respectfully submits that amended claim 50 is allowable over Schildkraut.

Given that claims 51 and 52 depend from amended claim 50, Applicant respectfully submits that claims 51 and 52 are likewise allowable over Schildkraut for at least the reasons discussed above with respect to amended claim 50.

With respect to claim 53, Applicant respectfully submits that, similar to the discussion above regarding amended claim 35, Schildkraut does not disclose means for searching a set of areas of an image for candidate pixels of one or more colors, the one or more colors comprising colors corresponding to red-eye, and means for combining the candidate pixels into a set of one or more pixel groups, the means for combining combining two candidate pixels into the same group if the two candidate pixels are adjacent one another as recited in amended claim 53. Thus, for at least these reasons, Applicant respectfully submits that amended claim 53 is allowable over Schildkraut.

Given that claim 54 depends from amended claim 53, Applicant respectfully submits that claim 54 is likewise allowable over Schildkraut for at least the reasons discussed above with respect to amended claim 53.

Applicant respectfully requests that the §102 rejections be withdrawn.

35 U.S.C. § 103

Claims 22-23, 32, and 47-48 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Schildkraut in view of U.S. Patent No. 6,285,410 to Marni (hereinafter "Marni"). Applicant respectfully submits that claims 22-23, 32, and 47-48 are not obvious over Schildkraut in view of Marni.

With respect to claims 22 and 23, claims 22 and 23 depend from amended claim 15. Applicant respectfully submits that Marni is not cited as curing, and does not cure, the deficiencies of Schildkraut discussed above with respect to amended claim 15. Thus, at least because of their dependency on amended claim 15, Applicant respectfully submits that claims 22 and 23 are allowable over Schildkraut in view of Marni.

With respect to claim 32, claim 32 depends from claim 30. Applicant respectfully submits that Marni is not cited as curing, and does not cure, the deficiencies of Schildkraut discussed above with respect to claim 30. Thus, at least because of its dependency on claim 30, Applicant respectfully submits that claim 32 is allowable over Schildkraut in view of Marni.

With respect to claims 47 and 48, claims 47 and 48 depend from amended claim 35. Applicant respectfully submits that Marni is not cited as curing, and does not cure, the deficiencies of Schildkraut discussed above with respect to amended claim 35. Thus, at least because of their dependency on amended claim 35, Applicant respectfully submits that claims 47 and 48 are allowable over Schildkraut in view of Marni.

Claims 33-34 and 41-42 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Schildkraut in view of U.S. Patent No. 6,204,858 to Gupta (hereinafter "Gupta"). Applicant respectfully submits that claims 33-34 and 41-42 are not obvious over Schildkraut in view of Gupta.

With respect to claims 33 and 34, claims 33 and 34 depend from claim 30. Applicant respectfully submits that Gupta is not cited as curing, and does not cure, the deficiencies of Schildkraut discussed above with respect to claim 30. Thus, at

least because of their dependency on claim 30, Applicant respectfully submits that claims 33 and 34 are allowable over Schildkraut in view of Gupta.

With respect to claims 41 and 42, claims 41 and 42 depend from amended claim 35. Applicant respectfully submits that Gupta is not cited as curing, and does not cure, the deficiencies of Schildkraut discussed above with respect to amended claim 35. Thus, at least because of their dependency on amended claim 35, Applicant respectfully submits that claims 41 and 42 are allowable over Schildkraut in view of Gupta.

Applicant respectfully requests that the §103 rejections be withdrawn.

Conclusion

Claims 15-35, 37-44, and 46-54 are in condition for allowance. Applicant respectfully requests reconsideration and issuance of the subject application. Should any matter in this case remain unresolved, the undersigned attorney respectfully requests a telephone conference with the Examiner to resolve any such outstanding matter.

Respectfully Submitted,

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